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OUTLINES GAINS, FUTURE PLANS OF MINING;
IRON INDUSTRY SHOWS PROGRESS

/Numbers in parentheses refer to appended sources./

In 1949, a substantial increase was made in the mining of ores, fluxes, and refractory materials in the USSR. Mining enterprises obtained new equipment which made it possible to increase the degree of mechanization of production processes. An increase of 8 percent in mechanization of ore haulage from the face to the underground haulage system and of 10 percent in mechanization of ore haulage to the surface are of particular merit. To increase labor productivity among miners and to intensify mine operations, experiments in using highly productive mining methods were made during the year in the Krivoy Rog mines and in mines of the lead and zinc industry. Experiments in block caving are being conducted successfully in the "Gigant" Mine of the Mine Administration imeni Dzerzhinskiy, the "Bol'shevik" Mine, and in the "Tsentral'naya" Mine of the Ingulets Mine Administration in Krivoy Rog.

The Sokol'nyy Mine of the Leninogorsk Combine is testing the method of block caving of the ore with laying mine charges and core charges in deep blast holes. Deep-drilled holes are being used extensively to break ore in the Krivoy Rog Basin and in the Mirgalimsay Mine.

Open-pit operations in iron ore, nonferrous metal, and nonmetallic mineral deposits have improved. Pits are using modern excavators and have considerably increased the volume of stripping and extraction of ore. Productivity of excavators in open-pit operations has increased 11 percent. In the pits mining limestone for fluxes, the yield of mined material per meter of blast hole has increased, crushing of limestone has improved, and excavator productivity has increased 11.6 percent as a result of switching to large-diameter holes (200 millimeters).

The use of truck haulage in the pits of the Kimpersay Mine Administration and the Balaklava and Bogurayevskiy mines has helped considerably in increasing the time spent by excavators in basic operations and has increased their productivity. Excavator productivity in the Kimpersay Mine Administration increased to 35,000 cubic

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meters per month per cubic meter of bucket capacity. In limestone pits using truck haulage, excavator productivity increased 30 percent and operational costs decreased 16 percent, as compared with pits which use railroad transport.

The utilization of cranes, terracing plows (otval'nyy plug), track-laying machines, and bulldozers increased the mechanization of rail transport, hauling, and leveling.

However, certain mining enterprises of the Ministry of the Metallurgical Industry are not making full use of production reserves. The copper and the lead and zinc industries have a very low coefficient of operating loading machines and scraper winches. Further increase in ore output in certain mines of the Krivoy Rog Basin is being prevented by the low capacity of the scraper winches and low freight capacity of the mine cars. Mechanization of mining processes is lagging in the Tula and Lipetsk mine administrations, the mine administration of the Kuznetsk Metallurgical Combine, and in mines producing manganese. Scientific research institutes of mining and hard alloy industries must produce in the next few months the long-awaited design of a bit for drilling ores of more than average hardness. Rotor excavators should be used in greater quantity in enterprises mining refractory materials. The conversion to large-capacity hauling cars should be speeded up. Conveyor hauling from the face should be used more extensively; hydromechanization of stripping and dumping work should be expanded, and bunker loading of clays increased.

The copper industry should put into operation the additional mining area which is now held in temporary conservation due to the prevalence of underground fires, and should also increase the mining of ore pillars left between rooms. It will be necessary to increase the productivity of the blocks which are being mined by slicing, and also to effect complete mechanization of haulage from the face and of timbering operations. In 1950, tests should be made of the practice of laying the worked-out mine areas with clay briquets. The lead and zinc mining industry should give more attention to mechanization of labor-consuming work and better utilization of equipment than was done in 1949, together with further construction of new mines and opening up of new levels. At the same time, the industry should experiment with more effective methods of mining.

In the nonmetallic industry, modernization of drilling and blasting should be continued, and schedules for train traffic and for loading of cars by excavators should be adopted. Experiments should be made in increasing the size of the blast holes to 230 millimeters and in utilizing cumulative charges.

In mechanizing mining operations, problems of making processes automatic should also be considered, primarily the adoption of the type of remote control operation of scraper winches developed by "Gintsvetmet" (State Scientific Research Institute of Nonferrous Metals). This development should be used at first in mines which are worked by top slicing. Drainage installations, switches, and ventilation doors should also be made automatic.

Mechanization of mining processes has been progressing steadily in the Krivoy Rog Iron Ore Basin. By the end of 1949, drilling had been 100 percent mechanized, hauling of ore from the face to haulage ways 92.3 percent, underground haulage 97.2 percent, surface haulage 95.5 percent, and loading 98.2 percent. Drilling is being made automatic by the introduction of drill carriages, pneumatic drill cores, telescopic drills, and drills for boring deep blast holes. Diamond drills and new types of drills are also being used. Tests of a crosscut drilling machine (burosoyechnaya mashina) have been successful, and new types of percussion drills and shot drills are being tested now.

To expand mechanization of loading, rock and ore haulage, and transport of materials, tools, and equipment in sublevels, pneumatic scraper winches and grab-bucket cranes are being used together with the VCh-1 loader for loading rock

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during the process of sinking the shaft. Automatic mine switches, roller switches conveyers, pneumatic bolts for manway doors, mechanized timber unloaders, and pneumatic ventilators for partial ventilation of the workings are being introduced into the basin. Complete mechanization is being carried out in the "Kommunar" Mine, Mine imeni Kirov, imeni Komintern, and in the "Novaya" Mine of the Mine Administration imeni Karl Libknekht.

In postwar years, efficiency experts in the basin have made a great contribution to successful reconstruction of the basin. Mine engineers A. P. Volodin, G. M. Malakhov, A. D. Polishchuk, F. I. Volkov, N. M. Brinze, and A. F. Menyaylo, chief mechanical engineer of the basin, were awarded the Stalin Prize for development of the highly productive system of forced block caving under Krivoy Rog conditions. The basin's mines are continually adopting the new and more effective methods of using deep blast holes for breaking the ore and the shrinkage system of mining. Twenty-one percent of all mining in the basin is done by the new systems. In 1948, the cost of one ton of ore for the basin as a whole decreased 6.3 percent more than planned, and 3.6 percent more than planned in 10 months of 1949.

Conversion to the two-shift work schedule enabled the Krivoy Rog Basin in July 1949 to increase considerably the average monthly mining level over the pre-war level. Labor productivity of the miners, despite the considerable change in personnel due to the influx of new, young workers, exceeded the 1940 level by 10 percent. (1) The basin completed its 1949 plan on schedule. (2) To increase output, the mines must expand the use of deep-drilled holes for breaking ore in using the block and sublevel caving methods. Special attention must also be given to improving ore haulage in the blocks. Scraper winches with 10- to 15-kilowatt motors must be replaced with winches having at least 20.5-kilowatt motors in the blocks which are being worked by one of the productive systems. There must be a rapid changeover to use of 5- to 10-ton mine cars. Another important task for the basin's workers is to increase ore quality. Concentration plants for magnetic concentration of depleted ores should be built at once at several of the mines. On this will depend the success of utilizing such productive systems of mining as block caving with the ore broken by core charges in deep blast holes. To supply metallurgical plants with a more permanently standardized ore, it will be necessary to organize operational planning for the specific purpose of standardizing ore quality in all stages of mining -- at the face, the bunker, grading station, and ore yard of the metallurgical plant itself.

In 1949, the iron mines of the "Uralruda" Trust considerably expanded their scale of operation, exceeding the plan for mining iron, manganese, and chromite ores and exceeding the 1948 production level. Output of sinter increased. All sinter plants of the trust fulfilled the plan, with particular success achieved by the Vysokaya Gora Sinter Combine.

Many mine administrations of the trust operated at the 1950 level during 1949 and attained an even higher level in the actual volume of finished production. This was particularly true of the Marsyaty Mine Administration, Sverdlovsk Oblast, for output of iron and manganese ore, the Vysokaya Gora Administration for iron ore and sinter, and the Zlatoust and Sarany administrations for ore mining.

In 1949, much attention was given to expansion of stripping, development, and cutting work. The volume of stripping was 140 percent of 1948 and the volume of development work 121 percent of 1948, according to incomplete data. The Marsyaty, Alapayevsk, Lebyazhinskoye, and Bogoslovskoye mine administrations achieved the highest volume of stripping work above plan in the trust, and the Bakal and Goroblagodatskoye administrations also completed a tremendous volume of stripping work, considerably exceeding the 1948 volume.

In addition to sinter, the plan for production of roasted, washed, and crushed ores was exceeded, the output of crude ore fines was decreased, output of crushed

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crude siderites rose sharply over 1948, and the plan for production of titanium concentrate and magnetite concentrate was substantially exceeded.(1)

The trust's Vysokaya Gora Administration was the first mine enterprise in the Urals to complete the Five-Year Plan for mining iron for metallurgical purposes.(3) In 10 months of 1949, the volume of ore mined by the administration was 22 percent higher than in the same period of 1948.(4)

A new crushing plant for processing quartzite was put into operation by the trust in 1949. The quartzite will be mined as a side product of the stripping work undertaken by the Bulandikhinskiy Mine of the Bakal Mine Administration.

In the last 2 years, the excavator park of the trust's mines has been restored and expanded by the addition of domestic-made equipment, including large open-pit excavators with a 3-cubic-meter bucket capacity, made by the Sverdlovsk "Uralmash" Plant and excavators with bucket capacities ranging from 0.5 to one cubic meter which will be used in other pits and mine sectors.

The drill park has been considerably increased by the addition of percussion drills. All large-scale mines have been equipped with railroad cranes, terrace plows, tractor planes, and other machinery. The transport equipment has been expanded and made to correspond to the requirements of the excavator equipment. Dump trucks have been used in starting open-pit operation in several sectors. The improvement in the general organization of production processes and the careful preparations for the winter season resulted in a substantial increase in the average productivity of the excavators per cubic meter of bucket capacity, exceeding the 1948 level, the 1949 plan, and the mean progressive norms. The same increase in productivity was made in the operation of the percussion drill equipment, locomotives, and other major machine equipment used in open-pit operations, and also for the majority of concentration installations.

The progress in mechanization of basic processes is shown by the following data for 1949: in open-pit mining, 95 percent of drilling operations, 99 percent of crude ore loading, and 100 percent of transport were mechanized; in underground operations, 91.5 percent of drilling operations, 76 percent of haulage from the face, 94 percent of underground haulage, 99 percent of surface haulage, and 91 percent of surface loading of railroad cars were mechanized.

Much was done in 1949 to improve technological processes. Improvements in drilling and blasting operations in open-pit mining made it possible to use the excavators on a more continuous basis. The placement of blast holes and methods of charging were improved so that the percent of oversize rubble per ton of loosened rock decreased in comparison with the plan and with 1948 results.

Complex mechanization of all processes, including the auxiliary (track maintenance, hauling of drills, dismantling of large mine machinery for repair, etc.), was introduced in the major pits. Use of excavators for terracing was adopted with satisfactory results in the Vysokaya Gora and Goroblagodatskoye mine administrations.

A group of engineers of the Vysokaya Gora Mine Administration have invented and built an original percussion drill designed for underground mining conditions. Tests have had excellent results, and the drill will be put into production for the "Uralruda" Trust's enterprises. The administration has also modernized the drill designed by Engineer Minyaylo which is being used by the administration and also the Bogoslovskoye and Sarany administrations for prospecting in underground workings. The Marsyaty and Goroblagodatskoye administrations are having excellent results in using the GP-1 drill for prospecting purposes.

Accepted mining methods were improved and altered last year. The chief method used is open stoping with the ore broken in sublevel drifts (68.5 percent of all underground mining) and the system of sublevel caving (up to 24 percent of all mining).

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The Zlatoust Mine Administration is considering the introduction of the shrinkage system in place of sublevel drifts.

The Pervomayskaya Mine of the Vysokaya Gora Mine Administration is preparing to use a new and highly productive method of working developed by a group of the administration's engineers. The Sarany Mine, together with more extensive use of rod drilling, has increased the height of the sublevel and in its leaner ore bodies -- the western and eastern -- has introduced complete mining of the ore without leaving ore pillars between the rooms, thereby cutting down on the loss of ore. The Auerbachovskaya Mine (Bogoslovskoye Mine Administration) has had success in percussion drilling of blast holes in using the glory-hole mining method (sistema voronok). Substantial improvements in underground mining methods have been made in the Marsyaty, Goroblagodatskoye, and Bakal administrations.

Hydrogeological operations have been increased in connection with the future increase in underground mining and the opening up of lower levels. A hydrogeological service has been organized in each administration which has underground mining sectors. Air lifts and specially drilled holes are being used to decrease the flow of water occurring when the shafts are lowered, and drainage sumps and other devices are used in checking water when the face is being advanced.

Much has been done by the trust to improve the technology of ore concentration and preparation of the ore for smelting. A proposal presented by Engineer I. M. Ravikovich at the Vysokaya Gora Sinter Combine improves the process of charging the sinter conveyers, eliminating segregation. Separators with alternating magnetic field have been introduced in the magnetic separation process and have increased metal recovery and the yield of concentrate. "Uralsmekhkhim" (Ural Scientific Research Institute for Mechanical Processing of Minerals) has developed an original solution to the problem of desulfurizing titanium concentrate. Automatic conveyor belt cleaners have been developed by efficiency experts Trunov and Prokhorov. Tests of obtaining open-hearth sinter have been successfully concluded and have helped to determine the conditions necessary for industrial utilization of this product.

In 1950, the Bogoslovskoye Mine Administration is expected to show a particularly great increase in mining as the result of opening a number of new production units. The Goroblagodatskoye, Vysokaya Gora, Lebyazhinskoye, Zlatoust, and Bakal administrations must complete construction of the first section and put into operation the large shafts which were sunk in previous years. Other mines will be building large concentration installations this year. General tasks for the trust as a whole which should be especially emphasized in 1950 include the industrial adoption of the highly productive method developed by the group of workers of the Vysokaya Gora Administration and the introduction of percussion drilling in underground workings.(1)

SOURCES

1. Gornyy Zhurnal, No 1, Jan 50
2. Pravda Ukrainy, No 308, 31 Dec 49
3. Izvestiya, No 272, 18 Nov 49
4. Krasnyy Flot, No 251, 23 Oct 49

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